

*latifolia*), Kadam (*Anthocephalus cadamba*), Panwar (*Cassia obtusifolia*), Custard apple (*Anona squamosa*), Torai (*Luffa* sp.), Aghada (*Achyranthus aspera*), and *Pennisetum cenchroides*, are new records from India. The author further found *Citrus* sp. and Guava to be the most preferred food plants in Madhya Pradesh as against mango reported by previous workers at other places in India.

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## 22. SOME OBSERVATIONS DURING OVIPOSITION IN THE LEMON BUTTERFLY, *PAPILIO DEMOLEUS* L.

Generally, an egg-laying female butterfly would be guided by at least two different stimuli while searching for the larval host plant—the odour of the host plant and the coloration of its leaves. The following few observations on the egg-laying behaviour of *Papilio demoleus* are of interest from this point of view.

While experimenting on the role of visual stimuli in the egg-laying behaviour of this insect, it was noticed that the female was not attracted to the characteristic colour alone presented by the blue-green, green or yellow-green papers of the standardized Ostwald series used in the above experiments. When, however, such papers were offered with the odour of Citrus plant, the larval host plant of this insect, was present (the plant being within the large experimental cage but not in direct view of the insects), the females responded strongly to the coloured paper leaves. On these, the females exhibited a characteristic 'drumming response' described previously (Vaidya 1956), which is preliminary to oviposition.

This response consists of approaching a coloured surface in flight and then hammering on it alternately with the front pair of legs. This is often accompanied by the simultaneous fluttering of wings and the ventral curving of the abdomen. Under experimental conditions, this response is usually obtained without its culminating in actual deposition of an egg.

Thus, with respect to the stimuli essential to the egg-laying female of *Papilio demoleus* to evoke a drumming response, it was observed that in addition to a characteristic coloured surface, the odour of the host plant had also to be supplied. Even in the presence of both these stimuli, it could not be successfully induced to lay eggs under experimental conditions, except in a few cases. It was remarkable indeed that none of the females actually seemed to search for the host plant, which was the source of odour. The mere presence of this odour served as a stimulus, which made them respond to the artificial coloured leaves.

A similar observation was made by Knoll (1921-26) on the egg-laying hawkmoth *Macroglossum stellatarum*. A small twig of *Gallium*, the host plant of this insect, was placed vertically in a test tube about 125 mm. long. The twig being shorter than the length of the test tube, it ended about 20 mm. below the mouth of the tube. The female hawkmoth kept flying at the part of the tube through which the leaves of *Gallium* were visible without taking any notice of the opening of the tube through which the scent emanated. It frequently touched the glass sides of the test tube as if to oviposit.

Ilse (1928) has also made a similar observation (described by her as 'Alarmierung durch den Duft'), in connection with the feeding response of certain Vanessid butterflies. She found that the presence of a sweet fruity smell of Amyl acetate made the feeding butterflies visit the artificial coloured flowers more actively.

The observations on *Papilio demoleus* give us a clue to the relative importance of odour and colour during its egg-laying state. There is no doubt that the odour of the host plant is, in this case, of prime importance, while colour plays only a secondary role.

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